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09/718,528	11/21/2000	John E. Dolan	SLA 0316	2544

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EXAMINER

DASTOURI, MEHRDAD

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 09/24/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/718,528

Applicant(s)

DOLAN, JOHN E.

Examiner

Mehrdad Dastouri

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2, 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Objections***

1. Claims 8 and 11-13 are objected to because of the following informalities:

In Line 4 of Claim 8, "direction;" should be corrected to "direction."

In Line 6 of Claim 13, "curvature;" should be corrected to "curvature."

In Line 1 of Claims 11, 12 and 13, "claim 5" should be corrected to "claim 10".

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noh (U.S. 5,946,420) in view of Ancin et al (U.S. 6,227,725).

Regarding Claim 1, Noh discloses a method for detecting text in a mixed-content image, said method comprising:

identifying an edge associated with a high-contrast intensity change (Figures 1 and 2; Column 6, Lines 51-61; Figure 5; Column 7, Lines 37-67, Column 8, Lines 1-40), convolution-based edge detection);

identifying a stroke axis (Figures 3-5; Column 8, Lines 17-32, plateau 124; Column 11, Lines 27-55, plateau D24);

measuring a spatial relationship between said axis and said edge (Figures 3-5; Column 8, Lines 17-56; Column 11, Lines 27-55); and

identifying said edge as a text edge when said spatial relationship conforms to specified criteria (Figures 3-5; Column 8, Lines 17-56; Column 11, Lines 27-55).

Noh discloses convolution-based edge-detection wherein the convolution acts as a first derivative edge-detection (Figure 5; Column 8, Lines 33-40), but does not explicitly disclose identifying an intensity gradient direction for said edge. However, identifying an intensity gradient direction is a conventional step in edge detecting process.

Ancin et al disclose a text enhancement system comprising identifying an intensity gradient direction of the text edges (Figure 2; Column 2, Lines 57-64; Column 4, Lines 19-66).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Noh's invention according to the teachings of Ancin et al to identify an intensity gradient direction of the text edges because it is an essential step in edge detection routinely implemented in image processing for text enhancement operations.

Regarding Claim 2, Ancin et al further disclose the method of Claim 1 wherein said identifying an edge and said identifying an intensity gradient direction comprises a first-derivative edge detection method (Figure 2; Column 2, Lines 57-64; Column 4, Lines 19-62).

Regarding Claim 3, Ancin et al further disclose the method of Claim 1 wherein said identifying an edge and said identifying an intensity gradient direction comprises a Sobel edge detection method (Figure 2; Column 4, Lines 19-62).

Regarding Claim 4, Noh further discloses the method of Claim 1 wherein said measuring a spatial relationship comprises a transverse directional search (Figures 3-5; Column 8, Lines 17-56; Column 11, Lines 27-55. As depicted in Figures 1-3, the spatial relationship of the stroke axis 124 and edges 123 (125) is measured in a transversal direction.).

Regarding Claim 5, Noh further discloses the method of Claim 1 wherein said measuring a spatial relationship comprises measuring the proximity of an edge to an axis in a direction substantially transverse to a stroke (Figures 3-5; Column 8, Lines 17-56; Column 11, Lines 27-55. As depicted in Figures 1-3, the spatial relationship of the stroke axis 124 and edges 123 (125) is measured based on the proximity of an edge to an axis in a direction substantially transverse to a stroke.).

Regarding Claim 6, Noh further discloses the method of Claim 1 wherein said measuring a spatial relationship comprises measuring the proximity of an edge to an axis in a direction substantially perpendicular to said axis (Figures 3-5; Column 8, Lines 17-56; Column 11, Lines 27-55. As depicted in Figures 1-3, the spatial relationship of the stroke axis 124 and edges 123 (125) is measured based on the proximity of an edge to an axis in a direction substantially perpendicular to the stroke axis.).

Regarding Claim 7, Noh further discloses the method of Claim 1 wherein said measuring a spatial relationship comprises measuring the proximity of an edge to an

axis in a direction parallel with said intensity gradient direction (Figures 1-3. Edges are inherently located at the intensity gradient directions.).

Regarding Claim 8, Noh further discloses the method of Claim 1 wherein said identifying a stroke axis comprises the acts of:

analyzing successive pixels to identify a coincident curvature position wherein a substantial curvature of an intensity map occurs at the same location as a minimal curvature of said intensity map in another direction (Figures 1-3; Column 3, Lines 15-20; Column 7, Lines 5-26. Substantial curvature and minimal curvature of the intensity map occur at the edge locations on the left and right sides of stroke axis 124.).

Regarding Claim 9, Ancin et al further disclose method of Claim 1 wherein said measuring a spatial relationship comprises the acts of:

beginning at a subject pixel that has been identified as an edge and progressively analyzing adjacent pixels in a direction parallel with the intensity gradient of the subject pixel (Figures 2 and 7A-7H; Column 4, Lines 19-62; Column 7, Lines 12-67, Column 8, Lines 1-47); and

analyzing each successive pixel to determine whether said successive pixel has been identified as an axis pixel (Figures 2 and 7A-7H; Column 4, Lines 19-62; Column 7, Lines 12-67, Column 8, Lines 1-47).

With regards to Claims 10, 18 and 21, arguments analogous to those presented for Claim 1 are applicable to Claims 10, 18 and 21.

With regards to Claim 11, arguments analogous to those presented for Claim 2 are applicable to Claim 11.

Regarding Claim 12, Noh further discloses the method of Claim 10 wherein said processing said image to identify axes comprises an analysis of intensity map curvature around a given location (Figures 1-3; Column 8, Lines 17-49).

Regarding Claim 13, Noh further discloses the method of Claim 10 wherein said processing said image to identify axes comprises analyzing successive pixels to identify a coincident curvature position wherein a maximum curvature of an intensity map, said maximum curvature being greater than a threshold value, occurs at the same location as a minimal curvature of said intensity map, said minimal curvature being lower than a specified value and being in a direction approximately perpendicular to said maximum curvature (Figures 1-3; Column 8, Lines 17-49; Column 11, Lines 34-59).

With regards to Claim 14, arguments analogous to those presented for Claims 1 and 7 are applicable to Claim 14.

With regards to Claims 15 and 21, arguments analogous to those presented for Claims 10 and 13 are applicable to Claims 15 and 21.

With regards to Claims 16 and 17, arguments analogous to those presented for Claim 10 are applicable to Claims 16 and 17.

With regards to Claims 18 and 19, arguments analogous to those presented for Claim 10 are applicable to Claims 18 and 19.

With regards to Claim 20, arguments analogous to those presented for Claim 13 are applicable to Claim 20.

***Other prior art cited***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,583,659 to Lee et al is cited for multi-windowing technique for thresholding an image using local image properties.

U.S. Patent 6,160,913 to Lee et al is cited for method and apparatus for digital halftone dots detection and removal in business documents.

U.S. Patent 6,408,109 to Silver et al is cited for apparatus and method for detecting and sub-pixel location of edges in a digital image.

U.S. Patent 5,583,949 to Smith et al is cited for apparatus and method for use in image processing.

***Contact Information***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

**MEHRDAD DASTOURI  
PRIMARY EXAMINER**

*Mehrdad Dastouri*

Mehrdad Dastouri  
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Group Art Unit 2623  
September 12, 2002